

REMARKS

Claims 1-10 are pending in the application. Reexamination and reconsideration are respectfully requested.

In the Office Action, claim 1 was rejected as being anticipated by KURIO (JP 11-14482). Further, claims 5-9 were rejected as obvious over KURIO in view of MITANI et al. (US 5,544,529). Lastly, while claim 10 is mentioned in the description of the rejection of claims 5-9, no *prima facie* case of obviousness has been made with respect to claim 10. Hence, Applicants submit this claim is allowable. Indeed, the Examiner acknowledges KURIO does not teach all of the elements of claim 10, and the Examiner does not disclose any other reference that teaches or suggests the missing feature.

In view of the following remarks, Applicants submit all claims 1-10 are patentable over KURIO whether taken alone or in view of MITANI.

Applicants' independent claim 1 recites a semiconductor pressure sensor. The pressure sensor comprises a substrate, a diaphragm formed on the substrate by a sacrificial layer etching method, and a silicon oxide film for sealing an etchant filling hole of a sacrificial layer on the diaphragm. The semiconductor pressure element is characterized in that a polysilicon film is provided to cover part or all of the silicon oxide film.

Similarly, Applicants' independent claim 5 recites a pressure detector that includes, as an integral unit, the substrate, diaphragm and silicon oxide film for sealing an etchant filling hole of a sacrificial layer on the diaphragm as discussed above.

By contrast, neither KURIO nor MITANI describe, teach or suggest a “silicon oxide film for sealing an etchant filling hole”. Rather, the references merely show a “silicon oxide film” and a polysilicon film covering an upper portion thereof.

Contrary to the Examiner’s assertions, while KURIO does disclose a substrate 101 and a diaphragm 111, the silicon oxide film 103 (see Figure 6) is not used to seal an etchant filling hole of a sacrificial layer as recited in Applicants’ claims. In Applicants’ invention, a sacrificial layer etching method is used to form a diaphragm on the substrate. To form the pressure cavity, the etchant filling hole is sealed with the silicon oxide film SiO_2 . Then, in order to achieve, for example, the advantage of preventing water intrusion into the cavity, the silicon oxide film is itself partially or entirely covered by a polysilicon film.

By contrast, in KURIO, the silicon oxide film 103 is used to insulate the diaphragm 111 and the movable electrode 104b. It is not a silicon oxide film for sealing an etchant filling hole as recited in Applicants’ independent claims 1 and 5. (Claim 10 similarly recites a silicon oxide film arranged over the diaphragm in order to seal the etching channels). KURIO’s SiO_2 further allows a widening of the distance between the diaphragm 111 and the movable electrode 104b, and a reduction in the stray capacitance generated between the two.

As noted above, in KURIO, silicon oxide film is not used to seal an etchant filling hole or channel. Indeed, the etchant channel may be sealed by a protection film 209 that is a nitride film. (See Figure 7).

In view of the foregoing, Applicants submit claims 1-10 are patentable over KURIO, whether taken alone or in combination with MITANI. In that regard, MITANI merely describes a pressure sensor and a chip therefor, without describing the semiconductor structure. Hence, it cannot remedy the deficiencies in KURIO.


For the foregoing reasons, Applicant submits claims 1-10 are now in condition for allowance. An early notice to that effect is solicited.

If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #381NP/50378).

Respectfully submitted,

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